

1   **WHAT IS CLAIMED IS:**

2           1. A method of estimating the link quality of a channel, wherein a fading  
3   value of said channel is calculated to modify a signal-to-noise ratio of said  
4   channel thereby deriving the link quality of said channel.

5           2. A method of estimating the link quality of a channel composed of  
6   subcarriers over which OFDM packets are transmitted, the method comprising  
7   the steps of:

8           estimating a noise quantity (B) of said channel based on two long  
9   training symbols contained in a received OFDM packet transmitted over said  
10   channel;

11          summing the absolute values of estimated subcarrier gain values ( $H_k$ ) of  
12   said subcarriers thereby obtaining an estimated channel gain value (A) of said  
13   channel;

14          estimating a fading value (F) of said channel based on said estimated  
15   subcarrier gain values; and

16          subtracting said fading value (F) from said estimated channel gain value  
17   to derive a channel gain measure (A-F), whereby the link quality of said channel  
18   is defined as a ratio of the channel gain measure (A-F) to the noise quantity (B).

19          3. The method as claimed in claim 2, the noise quantity estimating step  
20   further comprising:

21          receiving the first of said long training symbols from said channel to  
22   obtain a first subcarrier gain value  $H_{k,1}$  for each of said sub-carriers, where k  
23   denotes the sub-carrier index;

1 receiving the second of said two long training symbols from said  
2 channel to obtain a second subcarrier gain value  $H_{k,2}$  for each of said subcarriers;

3 and

4 estimating the noise quantity according to the relationship  
5  $B = \sum_{k=1}^N |H_{k,1} - H_{k,2}|$ , where N is the quantity of said subcarriers.

6 4. The method as claimed in claim 3, wherein said estimated subcarrier  
7 gain value ( $H_k$ ) of each subcarrier is calculated based on said first and second  
8 subcarrier gain values.

9 5. The method as claimed in claim 4, wherein said estimated subcarrier  
10 gain value ( $H_k$ ) of each subcarrier is an average value of said first and second  
11 subcarrier gain values.

12 6. The method as claimed in claim 3, wherein said fading value (F) is  
13 calculated according to the relationship  $F = \sum_{k=1}^N |H_k| - \frac{A}{N}$ .

14 7. The method as claimed in claim 4, wherein said fading value (F) is  
15 calculated according to the relationship  $F = \sum_{k=1}^N |H_k| - \frac{A}{N}$ .

16 8. The method as claimed in claim 5, wherein said fading value (F) is  
17 calculated according to the relationship  $F = \sum_{k=1}^N |H_k| - \frac{A}{N}$ .

18 9. An apparatus for estimating the link quality of a channel composed of  
19 subcarriers, said apparatus comprising:

20 channel gain estimating means for estimating a first and a second  
21 subcarrier gain values ( $H_{k,1}$   $H_{k,2}$ ) for each subcarrier based on two sequentially  
22 received long training symbols of a received OFDM packet;

1 calculating means for calculating a noise quantity (B), a fading value (F)  
2 and an estimated channel gain value (A) based on said first and second subcarrier  
3 gain values; and

4 link quality calculating means for calculating the quality of said channel,  
5 wherein said link quality calculating means performs a subtraction of said fading  
6 value from said estimated channel gain value (A-F) to derive a modified channel  
7 gain value, whereby the quality of said channel is defined as a ratio of the  
8 modified channel gain value (A-F) to the noise quantity (B).

9 10. The apparatus as claimed in claim 9, wherein said calculating means  
10 calculates the noise quantity (B) based on relationship  $B = \sum_{k=1}^N |H_{k,1} - H_{k,2}|$ , where  
11 N is the quantity of said sub-carriers.

12 11. The apparatus as claimed in claim 9, wherein said calculating means  
13 further calculates an average value of said first and second subcarrier gain values  
14 ( $H_{k,1}$   $H_{k,2}$ ) as an estimated subcarrier gain value ( $H_k$ ) for each subcarrier.

15 12. The apparatus as claimed in claim 11, wherein said estimated  
16 channel gain value (A) is derived by summing the absolute values of said  
17 estimated subcarrier gain values ( $H_k$ ).

18 13. The apparatus as claimed in claim 11, wherein said fading value (F)  
19 is calculated according to the relationship  $F = \sum_{k=1}^N \left| |H_k| - \frac{A}{N} \right|$ , where N is the  
20 quantity of subcarriers.

21 14. The apparatus as claimed in claim 12, wherein said fading value (F)  
22 is calculated according to the relationship  $F = \sum_{k=1}^N \left| |H_k| - \frac{A}{N} \right|$ , where N is the  
23 quantity of subcarriers.